PODIUM SESSION IV: INFECTION

IN1

COST-EFFECTIVENESS ANALYSIS OF DARUNAVIR/R FOR HIV INFECTION IN TREATMENT-EXPERIENCED ADULTS IN THE US: UNDERSTANDING THE UNCERTAINTY IN THE ESTIMATES

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OBJECTIVES: Cost-effectiveness estimates for new drugs are generally derived from limited data on product efficacy and likely treatment patterns. We evaluated the base-case cost-effectiveness, from a US perspective, of ritonavir-boosted darunavir (TMC114/r; darunavir/r), a novel protease inhibitor, plus an optimized background regimen (OBR) compared with currently available protease inhibitors plus OBR, for treating HIV infection in treatment-experienced adults. We then subjected these estimates to sensitivity and variability analyses, to assess the effects of uncertainty in the base-case estimates. **METHODS:** A Markov model with 3-month cycles was developed to follow patients through six health states defined by $CD4^+$ cell-count ranges. Transition probabilities were calculated from clinical trial data. Cost (2005 US dollars), utility, and mortality data were estimated from published US sources. The 5-year incremental cost-effectiveness ratio (ICER) was calculated for the base case. The base case was tested with one-way and probabilistic sensitivity analyses (PSA) as well as for alternative practice patterns, population and model characteristics (variability analyses). **RESULTS:** The base-case 5-year ICER for darunavir/r was $4657/QALY. The one-way sensitivity analysis results ranged from –$12,086/QALY (darunavir/r is dominant) to +$24,899/QALY. Results were most sensitive to uncertainty about durations of $CD4^+$ increase and stability, rates of $CD4^+$ change, and non-antiretroviral health care costs. By PSA, the probability of the ICER being below the commonly accepted threshold of $50,000/QALY was 95.5%. The variability analysis resulted in ICERs between –$42,029 (darunavir/r is dominant) and +$33,625. The lower bound occurred when tipranavir was the assumed comparator, while the upper bound occurred when the model time horizon was extended to lifetime. **CONCLUSION:** The impact of parameter uncertainty assessed by sensitivity analysis on the estimated ICER was less than the impact of variability. Each type of analysis contributes to a fuller understanding of the uncertainty in base-case cost-effectiveness estimates. After analyses of uncertainty, darunavir/r remains cost-effective.

IN2

MARKET STRUCTURE AND EFFECTIVENESS OF PRICE CONTROL FOR ANTIRETROVIRAL MEDICAMENTS IN COLOMBIA

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OBJECTIVES: Medicament prices restrict the population access to antiretroviral therapy in developing countries. International comparisons indicate Colombia is paying higher ARV prices than comparative developing countries. In addition, its health system is highly decentralized due to the large number of institutional buyers. This study addresses the effectiveness of the price control regulatory strategy to lower ARV prices and access to therapy. **METHODS:** A cross sectional study was performed through a survey designed for the universe of institutional ARV buyers (2005). This included insurers and hospitals linked to the Colombian Health and Social Security System. The survey asked information about VIH/AIDS infected population, individual ARV medicaments transactions, prices, discounts and procurement processes. Descriptive statistics and a multivariate economic model were performed. The answer rate covered over 87% of Colombian population. **RESULTS:** Study results accounted up to 20,697 persons HIV infected. A 79.8% treatment rate was obtained. Significant differences in the infection rate between both social insurance schemes were identified: Contributive insurance population had a 2.7 higher infection probability than those in the subsidized plan. The lineal regression model showed no significant relationship between the size of the insurance pool and antiretroviral final price to the buyer. Also, there were no price differences between direct purchases to manufacturers and those to distributors. There was a monopolistic tendency with 45% of medicaments offered by a single manufacturer. A market concentration index (Hirsmann-Herfindahl) show that 55% of medicaments purchased in oligopolistic settings. There were no significant price differences from brand-name medicaments and generic drugs in 12 up to 14 ARV medicaments. Finally, there were no significant relation between the regulated price and actual institutional prices. **CONCLUSION:** Colombia should diversify its regulatory mechanisms and incentives to assure competitiveness, and scale economies in antiretroviral purchases. This approach should face prospective strategies to compensate institutional market fragmentation.

IN3

THE ECONOMIC BURDEN OF VENTILATOR-ASSOCIATED PNEUMONIA DUE TO STAPHYLOCOCCUS AUREUS: FINDINGS FROM A NATIONAL DATABASE

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OBJECTIVES: Patients receiving mechanical ventilation are at an increased risk of pneumonia, which can prolong hospital stays and increase costs. There are limited national data on the costs of ventilator-associated pneumonia (VAP) due to *Staphylococcus aureus*, a common hospital-acquired pathogen. **METHODS:** This retrospective cohort study used data from the 2004 Health care Cost and Utilization Project Nationwide Inpatient Sample (HCUP-NIS). Ventilator-dependent patients with *S. aureus* pneumonia were identified based on ICD-9-CM diagnosis and procedure codes and compared to ventilator-dependent patients without a diagnosis of pneumonia. Excess length of stay (LOS) and costs were estimated. Multivariate models were used to adjust costs for potential confounding factors, including age, gender, mortality, hospital region, and comorbidity. **RESULTS:** We identified 198,269 hospitalized patients who required use of a ventilator, of whom 9592 (4.8%) were identified as having *S. aureus* pneumonia. Patients with VAP due to *S. aureus* were older (mean age 62 years vs. 49 years for the comparison group) and were more likely to have congestive heart failure, chronic pulmonary disease, diabetes and bacteremia/septicemia. Relative to the comparison group, patients with VAP due to *S. aureus* had significantly ($P < 0.001$) longer mean length of stay (25.6 vs. 14.5 days) and substantially higher average costs per stay ($72,820 vs. $40,171). After controlling for potentially confounding factors, the excess costs associated with VAP due to S. aureus were estimated to be approximately $14,000. **CONCLUSION:** Our findings suggest that the economic burden of ventilator-associated pneumonia (VAP) due to *Staphylococcus aureus*

among hospitalized patients is substantial. Further research is needed to assess the value of large hospital discharge databases for documenting and distinguishing the costs of specific bacterial pathogens.

IN4

ECONOMIC EVALUATION OF INFLUENZA PANDEMIC MITIGATION STRATEGIES IN THE US USING A STOCHASTIC MICROSIMULATION INFLUENZA MODEL

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OBJECTIVES: To project the potential impact of pandemic influenza mitigation strategies on health outcome, cost, and cost-effectiveness from a societal perspective. **METHODS:** We use a stochastic agent-based model to simulate pandemic influenza in the community. We compare 16 strategies to no intervention, focusing on targeted antiviral prophylaxis (TAP) with oseltamivir (treatment of identified index cases and prophylaxis of exposed people) alone and in combination with school closure. We also consider pre-vaccination of the population. We use the human capital approach to estimate productivity loss. Outcomes include number of cases, deaths, QALYs, direct and indirect costs, and incremental cost-effectiveness ratios (ICERs) expressed as costs per QALY gained. **RESULTS:** In the absence of intervention, we predict a 50% attack rate with an economic impact of $187 per capita. TAP + school closure and pre-vaccination + school closure (preventing 94–96% of cases at $2730 per capita)) are comparable in terms of QALY gain and total costs. The ICER compared to TAP alone (the most effective single strategy) is about $50,500/QALY for either strategy. The most effective single strategy is TAP alone (prophylaxis of 60% of close contacts of index cases) which effectively prevents 54% of cases at a cost of $120 per capita. If vaccine is available and administered before the onset of the pandemic, then pre-vaccinating 70% of the population with a partially effective vaccine prevents 48% of cases and is the least costly alternative ($99 per capita), dominating all but one TAP only strategies, treatment and school closure. Sensitivity analysis on key variables does not change the ranking of strategies but shows that mortality has the greatest impact on QALYs and hence ICERs. **CONCLUSION:** Targeted antiviral prophylaxis is an effective and cost-saving measure for mitigating pandemic influenza. Adding school closure provides greater benefit and is likely to be an attractive strategy if mortality is high.

PODIUM SESSION IV: OBESITY

OB1

IMPACT OF OBESITY SEVERITY ON HEALTH CONDITIONS AND MEDICAL COSTS IN THE US

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OBJECTIVES: To assess the impact of severity of obesity on medical comorbidities, perceived health status and medical costs in the US. **METHODS:** This study analyzed the 2004 Medical Expenditure Panel Survey (MEPS). Based on the Body Mass Index (BMI), weight groups were defined as Underweight (UW, BMI < 18.5), Normal Weight (NW, BMI 18.5–24.9), Overweight (OW, BMI 25–29.9), Obese I (BMI 30–34.9), Obese II (BMI 35–39.9), and Obese III (BMI >= 40). Multiple logistic regressions were modeled to estimate the impact of severity of obesity on medical comorbidities and perceived health status. Two part models (TPMs) were employed to estimate the cost functions controlling for socio-demographic characteristics and physical health conditions. All estimates are weighted to be nationally representative and the costs are adjusted for the Smearing effect. **RESULTS:** In the nationally representative sample (mean age 45.5 years; 51.4% female), 2.1% were UW, 37.0% NW, 35.1% OW, 16.4% obese I, 6.1% obese II and 3.4% obese III. Compared to NW, obese I, II and III were more likely to have diabetes (odds ratio (OR) = 3.5, 5.7, and 10.8, $p < 0.001$), asthma (OR = 1.4, 2.1, and 2.6, $p < 0.001$), and joint pain (OR = 1.7, 2.2 and 2.9, $p < 0.001$), and reported significantly poorer perceived health status (OR = 0.6, 0.4 and 0.3, $p < 0.001$), respectively. The TPMs results showed that compared to NW patients, obese II and III were more likely to incur higher costs (OR = 1.3, and 1.4, $p < 0.05$), and patients from obese I, II and II also had significantly higher costs compared to NW patients ($4643, $5000, $4811 vs. $3999, $p < 0.001$). **CONCLUSION:** Obesity is a major public health concern and has a large economic impact to the US population. The severity of obesity is significantly associated with increased medical comorbidities, decreased health status and high medical costs.

OB2

THE COST OF THE METABOLIC SYNDROME IN THE ELDERLY: FINDINGS FROM THE CARDIOVASCULAR HEALTH STUDY

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OBJECTIVES: The cardiovascular consequences of the metabolic syndrome and its component risk factors (i.e., abdominal obesity, low HDL cholesterol or elevated triglycercides, hypertension, elevated blood glucose) have been documented in the elderly. To date, little is known about how the metabolic syndrome and its components translate into long-term medical costs. **METHODS:** We used clinical data and matching, longitudinal Medicare claims from 3789 individuals aged 65 years and older in the Cardiovascular Health Study followed up to 10 years. The metabolic syndrome was defined according to the National Cholesterol Education Program's Third Adult Treatment Panel Report (NCEP-ATP III) criteria. W calculated costs by summing Medicare payment amounts for each participant, and discounted costs at 3% annually. Log-linear regression models were used to assess the independent contributions of the metabolic syndrome and its component risk factors to 10-year medical costs among. **RESULTS:** As defined by the NCEP ATP III criteria, the metabolic syndrome was present in 47% of the sample. Total per patient costs to Medicare were 20% higher among those with the metabolic syndrome ($40,827 vs. $32,962, $p < 0.001$). Controlling for age, gender, race and other covariates, abdominal obesity, low HDL cholesterol, and elevated blood pressure were associated with 15% (95% confidence interval [CI] 4.3%–26.7%), 16% (CI: 1.1%–31.8%), and 20% (CI 10.1%–31.7%) higher total costs, respectively. When added to the model, the metabolic syndrome composite variable did not contribute significantly ($p = 0.32$). **CONCLUSION:** Abdominal obesity, low HDL cholesterol, and hypertension, but not the metabolic syndrome, are important predictors of long-term costs in the Medicare population. The combined effects of abdominal obesity, low HDL cholesterol, and elevated blood pressure are associated with 50% higher Medicare costs.